

Appl. No.: 09/605,815
Amdt. dated 10/28/2004
Reply to Office Action of July 14, 2004

REMARKS/ARGUMENTS

Claims 1 through 6 stand rejected as unpatentable over the Tanaka and Downing references considered in combination. The Tanaka and Downing references are generally concerned with the production of cellulose ether, but neither reference teaches or suggests the grinding of cellulose pulp using a vertical roller mill as recited in Applicant's claims. There is no motivation to combine the teachings of the references to construct the invention, and there is no recognition of the benefits to be achieved in the production of cellulose particles having a more favorable bulk density, and particle size for reaction with alkali and the resultant cellulose ether having a reduced undissolved fiber content.

By way of background, cellulose ether is a valuable commercial product produced by reacting a fibrous powdered cellulose pulp with an alkali in solution. The raw cellulose is ground into the form of a powder so that the alkali solution may more easily permeate into the powdered cellulose, and so that the resultant cellulose ether may more readily dissolve in an aqueous solution. The manner in which the raw cellulose is ground impacts the effectiveness of the alkali treatment because the grinding method affects both the size and the shape of the ground cellulose particle, and therefore the ability of the cellulose particle to react with the alkali.

Cellulose raw materials, such as cotton linter pulp and wood pulp, have traditionally been ground by means of a grinder such as a knife mill. In addition, several alternative methods of grinding have been applied to the grinding of cellulose (see Patent Publications listed on p.1 of application). Although the grinding methods of the past were acceptable for grinding cellulose for use in a cellulose ether production process, the invention discloses and claims a substantially improved method of grinding cellulose by using a vertical roller mill. Use of the vertical roller mill to grind the cellulose starting material results in a powdered material having a desired shape and improves the productivity of the cellulose ether production process. (p.4 of application) The

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use of a vertical roller mill to grind cellulose and the benefits of such grinding were previously unknown.

The Downing reference discloses a method of reducing [grinding] cellulose by repeatedly compressing the cellulose between pairs of rollers until the cellulose loses its fibrous appearance. The double-roll grinding method disclosed by Downing is a specific method distinct from the vertical roller mill method of the invention. The Downing patent does not disclose or suggest a vertical roller mill. Indeed, the double-roll method is the crux of the Downing patent, so there is absolutely no indication that Applicant's method of using a vertical roller mill to grind cellulose could be used in place of Downing's disclosed grinding method. If anything, Downing's emphasis on the specific double-roll grinding method teaches away from the use of a vertical roller mill for grinding of cellulose.

The Tanaka reference is directed to a method of grinding cellulose ether into a powder. The cellulose ether product ground by Tanaka is chemically and physically distinct from the cellulose reactant ground by Applicant. Further, Tanaka grinds a cellulose ether product for the purpose of solubilizing the cellulose ether ([0003] translation of Tanaka) while Applicant grinds a cellulose reactant, not cellulose ether, for the purpose of obtaining a particle size and shape for improved reaction with an alkali solution. (p.4 of application) In short, Tanaka teaches the grinding of cellulose ether (not cellulose) and there is no suggestion in Tanaka to use the grinding method of Tanaka to grind cellulose particles or of the benefits to be achieved in cellulose ether production.

There is no suggestion to combine the references because neither reference discloses or suggests use of a vertical roller mill to grind raw cellulose or recognizes the improved physical characteristics of cellulose particles obtained by the vertical roller milling method. The unique physical characteristics of the powder obtained by the claimed method result in favorable reaction of the powder with alkali to provide improved production of cellulose ether compared to methods of the prior art. Specifically, the claimed method results in cellulose particles having an

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average particle diameter of 20 to 300 μm (page 7, line 10) and a lower bulk density than particles prepared by comparative grinding methods (page 11, Table 1). These attributes and the improved shape of the resulting particles reduce the undissolved fiber content in aqueous solutions of cellulose ether thereby improving the production of cellulose ether (page 4, lines 15 – 18). The many benefits of the claimed method are only evident in hindsight after review of the application and are not suggested by the references.

Further, there is no suggestion to substitute raw cellulose for the cellulose ether material ground by the vertical roller mill of Tanaka. Excerpts from reference texts (particularly relevant portions are outlined in the text) are enclosed which show cellulose ethers have significantly different physical and chemical properties from cellulose, such as solubility and crystallinity. Because of the distinct physical and chemical properties, one of skill in the art would not consider the two compositions to be interchangeable and would not assume that the two materials had similar grinding characteristics. Thus, there is no motivation to alter the teachings of Tanaka by substituting cellulose for cellulose ether.

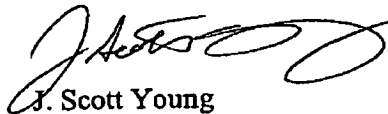
Applicant submits that all pending Claims 1 through 6 are patentable over the Downing and Tanaka references, considered alone or in combination, and are now in condition for immediate allowance. Applicant respectfully requests that the claims be allowed to issue. If the Examiner wishes to discuss the application or the comments herein, the Examiner is urged to contact the undersigned by telephone.

It is not believed that extensions of time or fees for net addition of claims are required, beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 CFR § 1.136(a), and any fee required

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therefore (including fees for net addition of claims) is hereby authorized to be charged to Deposit
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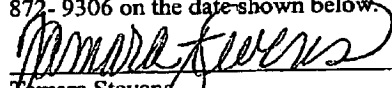
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